REMARKS

Initially, Applicants respectfully acknowledge that the Examiner has indicated that claims 54 and 57, which are objected to, would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

Claims 1-23, 25-38, 40, 42-48, 51-56, and 58-61 remain pending in the application. Claims 24, 39, 41, 49, 50 and 57 have been canceled without prejudice or disclaimer of the subject matter thereof.

Reconsideration of the rejections and allowance of the pending application in view of the foregoing amendments and following remarks are respectfully requested.

In the Office Action claims 1-51 and 59-61 are rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. In this regard, the Examiner has asserted that the limitation "allowing collision among multi-dimensional orthogonal resource hopping patterns within some data symbol durations" recited in claims 1 and 59 is not supported by the specification.

In response, Applicants submit that "allowing collisions among hopping patterns" is disclosed in the paragraph of page 43, lines 6-13, as the Examiner has indicated. Further, Applicants submit the meaning of "allowing collision among multi-dimensional orthogonal resource hopping patterns within some data symbol durations" is that the primary communication station does not need to change the multi-dimensional orthogonal resource hopping patterns to secondary communication stations in order to avoid the collision within the

data symbol duration because said primary communication station has a collision comparator and controller. Instead of changing orthogonal resource hopping patterns, the comparator and controller decides whether all the data symbols modulated by the collided orthogonal resource element are perforated (not transmitted) or not.

Therefore, Applicants respectfully submit that "allowing collision among multi-dimensional orthogonal resource hopping patterns within some data symbol durations" is also disclosed in the specification. Further, in response, claim 1 has been amended to delete the phrase "allowing collision among multi-dimensional orthogonal resource hopping patterns within some data symbol durations". Thus, Applicants respectfully submit that the rejection under 35 U.S.C. 112, first paragraph, is now moot.

In the Official Action claim 58 is rejected under 35 U.S.C. 102(e) as being anticipated by Dent, U.S. Patent No. 6,112,094, and claims 52 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dent in view of Haartsen, U.S. Patent No. 6,009,332. These rejections are respectfully traversed.

In response, each of independent claims 52 and 58 has been amended to recite the features of canceled claim 57 which has been indicated as allowable, a controller that comprises a multi-dimensional hopping pattern collision detector which detects the collision of said multi-dimensional hopping patterns, a transmitting data symbol comparator which compares whether the data symbols for the corresponding channels are identical or not at the time of collision of said multi-dimensional hopping patterns, and a perforator which can stop the transmission of the data symbol when said

comparator indicates that all the corresponding data symbols are not identical.

Further, Dent discloses a method that a base station (primary communication station) in a cell allocates collision-free, orthogonal frequency hopping sequences to mobile stations (remote stations or secondary communication stations) within the cell. Applicants note that in the abstract of Dent, "stations within cells select different channel frequencies" is disclosed. That is, when the mobile station (secondary communication station) establishes a call, the base station (primary communication station) allocates an orthogonal frequency hopping sequence to the mobile station within a cell governed by said base station so that the orthogonal frequency hopping sequence used in the mobile station cannot cause a hopping sequence collision with the orthogonal frequency hopping sequences used in other mobile stations within said cell during a communication. In this method, the base station sends the hopping sequence directly to the mobile station, or the base station and the mobile station stores the hopping sequences in their internal memories, and then the base station sends an index value indicating the designated hopping sequence. The purpose of Dent is for averaging interference from base stations located in other cells.

Also, if the number of available orthogonal frequency is N, since there are no collisions among the orthogonal frequency hopping sequences, when a mobile station establishes the first call, the number of cases for selecting one hopping sequence is N. However, when another mobile station establishes the second call, the number of cases for selecting one collision-free hopping sequence is decreased to N-1.

Therefore, when the other mobile station establishes the Nth call, since the number of cases for selecting one collision-free hopping sequence is 1, the remaining hopping sequence is allocated to the mobile station. Subsequently, when a mobile station wants to establishes the (N+1)th call, since there are no more collision-free, orthogonal frequency hopping sequences to be allocated, the new call-up is blocked.

In contrast to Dent, a present embodiment discloses a method that a base station (primary communication station) allocates an orthogonal resource hopping pattern, which may experience a collision among hopping patterns, to a mobile station (secondary communication station). That is, when the mobile station (secondary communication station) establishes a new call, the base station (primary communication station) allocates an orthogonal resource hopping pattern to the mobile station so that the orthogonal resource hopping pattern used in the mobile station may cause a collision with the orthogonal resource hopping patterns used in other mobile stations during a communication.

When collisions occur among the hopping patterns of active downlink channels, a comparator and controller at the transmitter in a base station performs one of the following two operations:

1) If at least one of channel-encoded data symbols modulated by the same orthogonal resource is different from others, then all the data symbols colliding during the symbol time are not transmitted. This effect is called '**perforation**' by the inventors. In spite of perforated symbols the channel decoder at the corresponding mobile station can

recover the transmitted data if the number of perforated data symbols within a channel-encoded block, i.e. frame, is less than a threshold. Perforation means that the transmission power during the symbol time is zero for all related channels. 2) If all channel encoded data symbols modulated by the same orthogonal resource are identical, then all the data symbols with collisions are transmitted without perforation. Although the transmission signal amplitude assigned to each related mobile station is not changed during the symbol time, the transmission signal amplitude of the orthogonal resource during the symbol time can be the sum of the signal amplitudes assigned for all corresponding downlink channels. This effect is called '**synergy**' by the inventors.

Subsequently, when a mobile station establishes a call allowing some collisions among the orthogonal resource hopping patterns, an orthogonal resource hopping pattern is allocated to a downlink channel to the mobile station. In order to increase the efficiency of orthogonal resources which are a very limited resource, an aspect of the present invention presents a method implementing a statistical multiplexing scheme which is used to accommodate a larger number of users with low channel activity than the number of the orthogonal resource combinations which is the product of the number of each orthogonal resource.

Also, another aspect provides **a collision comparator & controller**. This is another difference between the present invention and the cited references. They consider hopping patterns of each channel and data symbols to be transmitted, and determine whether the hopping patterns collide and check whether the modulated data symbols of all

channels experiencing the collisions are all the same. Depending on whether all colliding data symbols are identical or not, they perform synergies or perforations, respectively.

Claims 1-3, 47, 48, and 59-61 have been amended to more clearly define structural features. No new matter is believed to be introduced by this amendment.

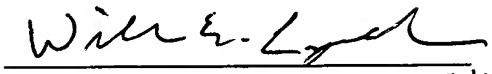
Independent claims 1, 52, 58 and 59 are now in condition for allowance in view of the amendments and the above-noted remarks, and claims 2-23, 25-38, 40, 42-48, 51, 53-56, 60 and 61 dependent thereon are also submitted to be in condition for allowance in view of their dependence from the allowable base claims and also at least based upon their recitations of additional features of the present invention. It is respectfully requested, therefore, that the rejections under 35 U.S.C. 102(e), 35 U.S.C. 103(a) and the first paragraph of 35 U.S.C. 112 be withdrawn and that an early indication of the allowance thereof be given.

Any amendments to the claims which have been made in this amendment, and which have not been specifically noted to overcome a rejection based on prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to be attached thereto.

Based on the above, it is respectfully submitted that this application is now in condition for allowance, and a Notice of Allowance is respectfully requested.

Should the Examiner have any questions or comments regarding this response, or the present application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
Dan-Keun Sung et al.



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